General

Title

Pancreatic resection mortality: percentage of in-hospital deaths per 1,000 discharges with pancreatic resection, ages 18 years and older.

Source(s)

AHRQ Quality Indicators™ (AHRQ QI™) ICD-10-CM/PCS specification version 6.0. Inpatient Quality Indicator 09 (IQI 09) pancreatic resection mortality rate. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2016 Mar. 8 p.

National Quality Forum measure information: pancreatic resection mortality rate (IQI 9). Washington (DC): National Quality Forum (NQF); 2015 Dec 2. 14 p.

Measure Domain

Primary Measure Domain

Clinical Quality Measures: Outcome

Secondary Measure Domain

Does not apply to this measure

Brief Abstract

Description

This measure is used to assess the percentage of in-hospital deaths per 1,000 discharges with pancreatic resection for cancer, ages 18 years and older.

The indicator is presented in two strata based on the presence or absence of pancreatic cancer diagnosis. This measure summary represents the overall rate. See also the "Basis for Disaggregation" field.

Rationale

Pancreatic resection is a rare procedure that requires technical proficiency, and errors in surgical technique or management may lead to clinically significant complications, such as sepsis, anastomotic breakdown,

and death. Better processes of care may reduce mortality for pancreatic resection, which represents better quality care.

Evidence for Rationale

National Quality Forum measure information: pancreatic resection mortality rate (IQI 9). Washington (DC): National Quality Forum (NQF); 2015 Dec 2. 14 p.

Primary Health Components

Pancreatic cancer; pancreatic resection; death

Denominator Description

Discharges, for patients ages 18 years and older, with any-listed International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) or International Classification of Diseases, Tenth Revision, Procedure Coding System (ICD-10-PCS) procedure codes for partial pancreatic resection or any-listed ICD-9-CM or ICD-10-PCS procedure codes for total pancreatic resection (see the related "Denominator Inclusions/Exclusions" field)

Numerator Description

Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator

Evidence Supporting the Measure

Type of Evidence Supporting the Criterion of Quality for the Measure

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Additional Information Supporting Need for the Measure

Unspecified

Extent of Measure Testing

Reliability Testing

Data/Sample. Contains 30 million adult discharges and 4,000 hospitals ("Healthcare Cost and Utilization Project [HCUP] State Inpatient Databases [SID]," 2008).

Analytic Method. The developer's metric of reliability is the signal to noise ratio. The signal to noise ratio is the ratio of the between hospital variance (signal) to the within hospital variance (noise). The formula is signal / (signal + noise). The ratio itself is only a diagnostic for the degree of variance in the risk-adjusted rate systematically associated with the provider. Therefore, what matters is the magnitude of the variance in the "smoothed" rate (that is, the variance in the risk-adjusted rate after the application of the univariate shrinkage estimator based on the signal ratio).

Testing Results. Updated testing results including both benign and malignant cases:

What the data demonstrate is systematic variation in the provider level rate of 10.2 to 85.6 per 1,000 from the 5th to 95th percentile after a signal ratio of 0.549 is applied as the shrinkage estimator (that is, after accounting for variation due to random factors). (The signal ratio for benign cases only is 0.451 and for malignant cases only is 0.350.)

Validity Testing

Data/Sample. One-hundred percent national analytic files from the Centers for Medicare and Medicaid Services (CMS) for the calendar years 2003 through 2006 were used. Medicare Provider Analysis and Review (MEDPAR) files, which contain hospital discharge abstracts for all fee-for-service acute care hospitalizations of all U.S. Medicare recipients, were used to create the main analytical datasets. The Medicare denominator file was used to assess patient vital status at 30 days. Using appropriate procedure codes from the International Classification of Diseases, version 9 (ICD-9 codes), all patients aged 65 to 99 undergoing pancreatectomy were identified (Dimick, Staiger, & Birkmeyer, 2010).

Analytic Method. The developer first estimated risk-adjusted hospital mortality rates during 2003 to 2004. Mortality was defined as death within 30 days of operation or before hospital discharge. The developer adjusted for patient age, gender, race, urgency of operation, median ZIP-code income, and coexisting medical conditions. Using logistic regression, they estimated the expected number of deaths in each hospital and then divided the observed deaths by this expected number of deaths to obtain the ratio of observed to expected mortality (O/E) ratio. The developer then multiplied the O/E ratio by the average mortality rate to obtain a risk-adjusted mortality rate for each hospital. Next hierarchical modeling techniques were used to adjust these mortality estimates for reliability. Using random effects logistic regression models, empirical Bayes predictions of mortality for each hospital were generated (Dimick, Staiger, & Birkmeyer, 2010).

Testing Results. In assessing the ability of hospital mortality rankings to predict future performance, reliability adjustment was particularly important for pancreatic resection and abdominal aortic aneurysm (AAA) repair, hospital rankings based on reliability-adjusted mortality were superior at identifying hospitals likely to have the lowest future mortality. Without reliability adjustment, hospitals in the "best" quintile (2003 to 2004) with pancreatic resection had a mortality of 7.6 percent in 2005 to 2006; with reliability adjustment, the "best" hospital quintile had a mortality of 2.7 percent in 2003 to 2006 (Dimick, Staiger, & Birkmeyer, 2010).

Refer to the original measure documentation for additional measure testing information.

Evidence for Extent of Measure Testing

Dimick JB, Staiger DO, Birkmeyer JD. Ranking hospitals on surgical mortality: the importance of reliability adjustment. Health Res Educ Trust. 2010 Dec;45(6 Pt 1):1614-29. PubMed

Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID). Rockville (MD): Agency for Health Research and Quality (AHRQ); 2008.

National Quality Forum measure information: pancreatic resection mortality rate (IQI 9). Washington (DC): National Quality Forum (NQF); 2015 Dec 2. 14 p.

State of Use of the Measure

State of Use

Current routine use

Current Use

not defined yet

Application of the Measure in its Current Use

Measurement Setting

Hospital Inpatient

Professionals Involved in Delivery of Health Services

not defined yet

Least Aggregated Level of Services Delivery Addressed

Single Health Care Delivery or Public Health Organizations

Statement of Acceptable Minimum Sample Size

Does not apply to this measure

Target Population Age

Age greater than or equal to 18 years

Target Population Gender

Either male or female

National Strategy for Quality Improvement in Health Care

National Quality Strategy Aim

Better Care

National Quality Strategy Priority

Making Care Safer
Prevention and Treatment of Leading Causes of Mortality

Institute of Medicine (IOM) National Health Care Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

IOM Domain

Effectiveness

Safety

Data Collection for the Measure

Case Finding Period

Time window can be determined by user, but is recommended as a calendar year.

Denominator Sampling Frame

Patients associated with provider

Denominator (Index) Event or Characteristic

Institutionalization

Patient/Individual (Consumer) Characteristic

Therapeutic Intervention

Denominator Time Window

not defined yet

Denominator Inclusions/Exclusions

Inclusions
Discharges, for patients ages 18 years and older, with any-listed International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) or International Classification of Diseases, Tenth Revision, Procedure Coding System (ICD-10-PCS) procedure codes for partial pancreatic resection or any-listed ICD-9-CM or ICD-10-PCS procedure codes for total pancreatic resection

Exclusions
Exclude cases:

> With any-listed ICD-9-CM or International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnosis code for acute pancreatitis
> Transferring to another short-term hospital (DISP=2)
> Major Diagnostic Categories (MDC) 14 (pregnancy, childbirth, and puerperium)
> With missing discharge disposition (DISP=missing), gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing) or principal diagnosis (DX1=missing)

Exclusions/Exceptions

not defined yet

Numerator Inclusions/Exclusions

Inclusions
Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator

Exclusions
Unspecified

Numerator Search Strategy

Institutionalization

Data Source

Administrative clinical data

Type of Health State

Death

Instruments Used and/or Associated with the Measure

Unspecified

Computation of the Measure

Measure Specifies Disaggregation

Measure is disaggregated into categories based on different definitions of the denominator and/or numerator

Basis for Disaggregation

The indicator is presented in two strata based on the presence or absence of pancreatic cancer diagnosis.

Numerator (Stratum A & B)

Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator.

Denominator (Stratum A)

Discharges, for patients ages 18 years and older, with either:

> Any-listed International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)
> or International Classification of Diseases, Tenth Revision, Procedure Coding System (ICD-10-PCS)

procedure codes for partial pancreatic resection and any-listed ICD-9-CM or International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnosis codes for pancreatic cancer; or
Any-listed ICD-9-CM or ICD-10-PCS procedure codes for total pancreatic resection and any-listed ICD-9-CM or ICD-10-CM diagnosis codes for pancreatic cancer

Denominator (Stratum B)

Discharges, for patients ages 18 years and older, with either:

Any-listed ICD-9-CM or ICD-10-PCS procedure codes for partial pancreatic resection without any-listed ICD-9-CM or ICD-10-CM diagnosis codes for pancreatic cancer; or
Any-listed ICD-9-CM or ICD-10-PCS procedure codes for total pancreatic resection without any-listed ICD-9-CM or ICD-10-CM diagnosis codes for pancreatic cancer

Denominator Exclusions (Stratum A & B)

Exclude cases:

With any-listed ICD-9-CM or ICD-10-CM diagnosis code for acute pancreatitis
Transferring to another short-term hospital (DISP=2)
Major Diagnostic Categories (MDC) 14 (pregnancy, childbirth, and puerperium)
With missing discharge disposition (DISP=missing), gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing) or principal diagnosis (DX1=missing)

Note: Refer to the original measure documentation for ICD-9-CM, ICD-10-PCS, and ICD-10-CM codes.

Scoring

Rate/Proportion

Interpretation of Score

Desired value is a lower score

Allowance for Patient or Population Factors

not defined yet

Description of Allowance for Patient or Population Factors

The predicted value for each case is computed using a hierarchical model (logistic regression with hospital random effect) and covariates for gender, age in years (in 5-year age groups), All Patient Refined-Diagnosis Related Group (APR-DRG) and APR-DRG risk of-mortality subclass. The reference population used in the model is the universe of discharges for states that participate in the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) for the year 2008 (updated annually), a database consisting of 43 states and approximately 30 million adult discharges. The expected rate is computed as the sum of the predicted value for each case divided by the number of cases for the unit of analysis of interest (i.e., hospital). The risk adjusted rate is computed using indirect standardization as the observed rate divided by the expected rate, multiplied by the reference population rate.

Refer to *Inpatient Quality Indicators (IQI) Parameter Estimates ICD-9-CM Version 6.0* in the "Companion Documents" field for additional information.

Standard of Comparison

not defined yet

Identifying Information

Original Title

IQI 9: pancreatic resection mortality rate.

Measure Collection Name

Agency for Healthcare Research and Quality (AHRQ) Quality Indicators

Measure Set Name

Inpatient Quality Indicators

Submitter

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Developer

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Funding Source(s)

Agency for Healthcare Research and Quality (AHRQ)

Composition of the Group that Developed the Measure

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicator (QI) measures are developed by a team of clinical and measurement experts in collaboration with AHRQ. The AHRQ QIs are continually updated as a result of new research evidence and validation efforts, user feedback, guidance from the National Quality Forum (NQF), and general advances in the science of quality measurement.

Financial Disclosures/Other Potential Conflicts of Interest

None

Endorser

National Quality Forum - None

NQF Number

not defined yet

Date of Endorsement

2015 Jan 5

Adaptation

This measure was not adapted from another source.

Date of Most Current Version in NQMC

2016 Mar

Measure Maintenance

Measure is reviewed and updated on a yearly basis

Date of Next Anticipated Revision

Unspecified

Measure Status

This is the current release of the measure.

AHRQ QI research version 5.0. Inpatient quality indicator 9 technical specifications: pancreatic resection mortality rate. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 3 p.

Measure Availability

Source available from the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators (QI) Web site [   ].

For more information, contact the AHRQ QI Support Team at 5600 Fishers Lane, Rockville, MD 20857; E-mail: QIsupport@ahrq.hhs.gov; Phone: 301-427-1949.

Companion Documents

The following are available:

Davies GM, Geppert J, McClellan M, et al, UCSF-Stanford Evidence-based Practice Center. Refinement of the HCUP quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2001 May. (Technical review; no.4). This document is available from the AHRQ Quality Indicators Web site [   ].
AHRQ quality indicators. Inpatient quality indicators (IQI) parameter estimates ICD-9-CM version 6.0. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2017 Mar. 66 p. This document is available from the AHRQ Quality Indicators Web site [   ].
AHRQ quality indicators. Inpatient quality indicators ICD-9-CM benchmark data tables version 6.0. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2017 Mar. 28 p. This document is available from the AHRQ Quality Indicators Web site [   ].

AHRQ quality indicators. Inpatient quality indicators (IQI) log of ICD-9-CM, ICD-10-CM/PC, and DRG coding updates and revisions to IQI documentation and software version 6.0. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2017 Mar. 48 p. This document is available from the AHRQ Quality Indicators Web site [   ].

AHRQ quality indicators. Inpatient quality indicators composite measure workgroup. Final report. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Mar. various p. This document is available from the AHRQ Quality Indicators Web site [   ].

HCUPnet: a tool for identifying, tracking, and analyzing national hospital statistics. [Web site]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); [accessed 2017 Mar 24]. HCUPnet is available from the AHRQ Web site [   ].

NQMC Status

This NQMC summary was completed by ECRI on December 4, 2002. The information was verified by the Agency for Healthcare Research and Quality on December 26, 2002.

This NQMC summary was updated by ECRI on April 7, 2004, August 19, 2004, and March 4, 2005. The information was verified by the measure developer on April 22, 2005.

This NQMC summary was updated by ECRI Institute on August 17, 2006, on May 29, 2007, on October 20, 2008 and on August 27, 2010.

This NQMC summary was reviewed and edited by ECRI Institute on July 13, 2011.

This NQMC summary was retrofitted into the new template on July 14, 2011.

This NQMC summary was updated by ECRI Institute on March 25, 2013 and December 9, 2015. The information was verified by the measure developer on February 16, 2016.

This NQMC summary was updated again by ECRI Institute on April 10, 2017. The information was verified by the measure developer on May 3, 2017.

Copyright Statement

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Production

Source(s)

AHRQ Quality Indicatorsâ„¢ (AHRQ QIâ„¢) ICD-10-CM/PCS specification version 6.0. Inpatient Quality Indicator 09 (IQI 09) pancreatic resection mortality rate. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2016 Mar. 8 p.

National Quality Forum measure information: pancreatic resection mortality rate (IQI 9). Washington (DC): National Quality Forum (NQF); 2015 Dec 2. 14 p.

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